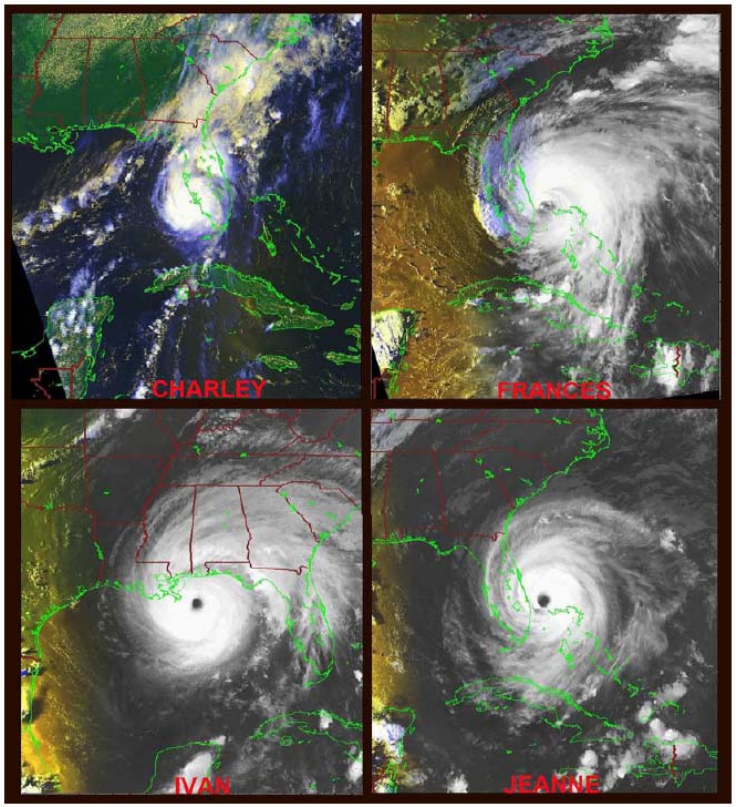
Shore Protection Project Performance Improvement Initiative (S3P2I)

Coastal CoP
May 16, 2006

2004 Florida Hurricane Season

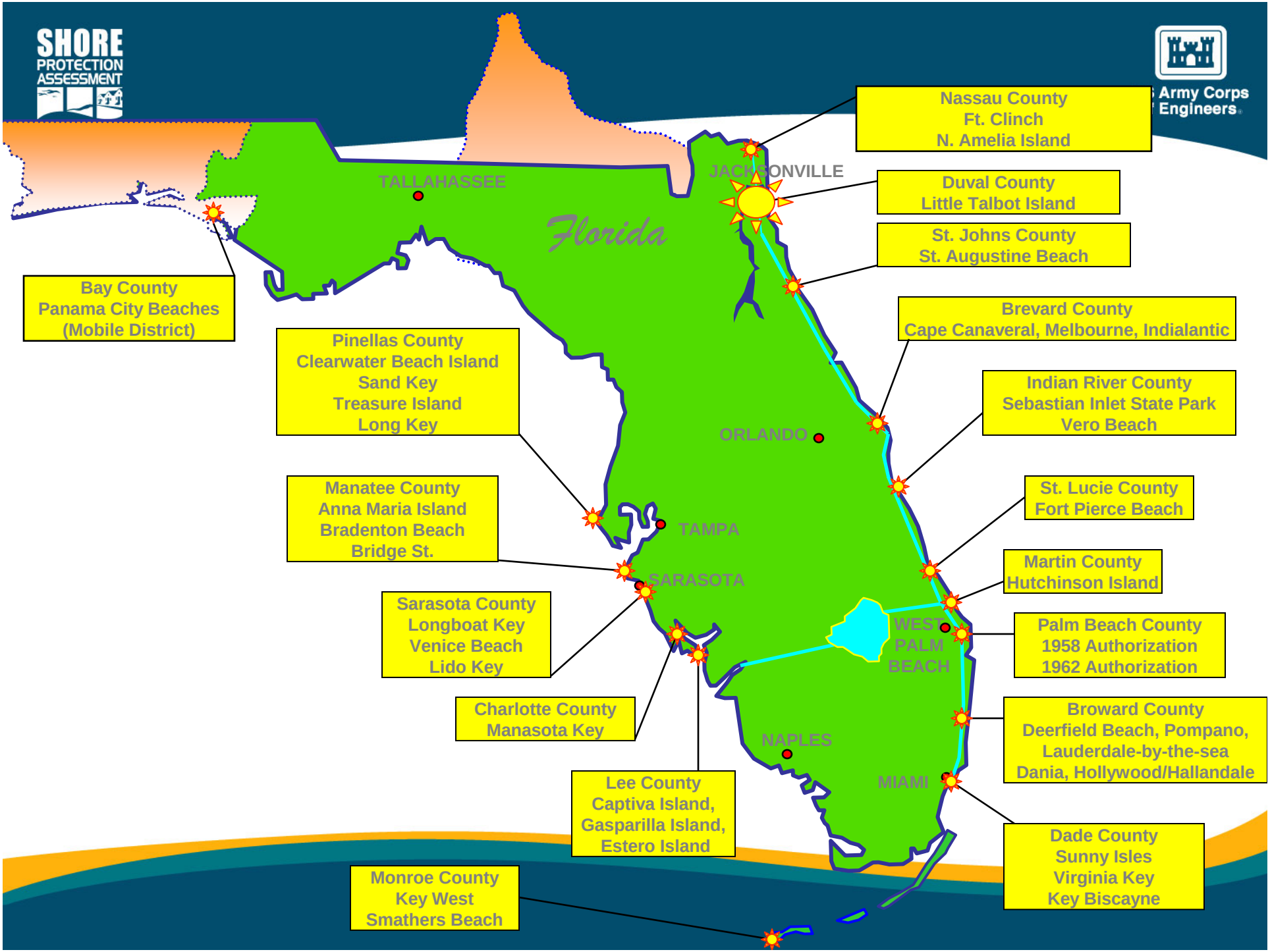
CHARLEY – Cat 4
Aug 14 – Lee County



FRANCES – Cat 2
Sept 5 – Martin County

IVAN – Cat 3
Sept 15 – Gulf Shores, AL

JEANNE – Cat 3
Sept 26 – Martin County


SHORE PROTECTION ASSESSMENT
Army Corps of Engineers
Florida
TALLAHASSEE
JACKSONVILLE
ORLANDO
TAMPA
SARASOTA
WEST PALM BEACH
NAPLES
MIAMI
Nassau County
Ft. Clinch
N. Amelia Island
Duval County
Little Talbot Island
St. Johns County
St. Augustine Beach
Brevard County
Cape Canaveral, Melbourne, Indialantic
Indian River County
Sebastian Inlet State Park
Vero Beach
St. Lucie County
Fort Pierce Beach
Martin County
Hutchinson Island
Palm Beach County
1958 Authorization
1962 Authorization
Broward County
Deerfield Beach, Pompano,
Lauderdale-by-the-sea
Dania, Hollywood/Hallandale
Dade County
Sunny Isles
Virginia Key
Key Biscayne
Monroe County
Key West
Smathers Beach
Lee County
Captiva Island,
Gasparilla Island,
Estero Island
Charlotte County
Manasota Key
Sarasota County
Longboat Key
Venice Beach
Lido Key
Manatee County
Anna Maria Island
Bradenton Beach
Bridge St.
Pinellas County
Clearwater Beach Island
Sand Key
Treasure Island
Long Key
Bay County
Panama City Beaches
(Mobile District)

Program Structure

Steering Committee

Kaiser Edmond, CESAD

Joseph Vietri, CENAD/CX

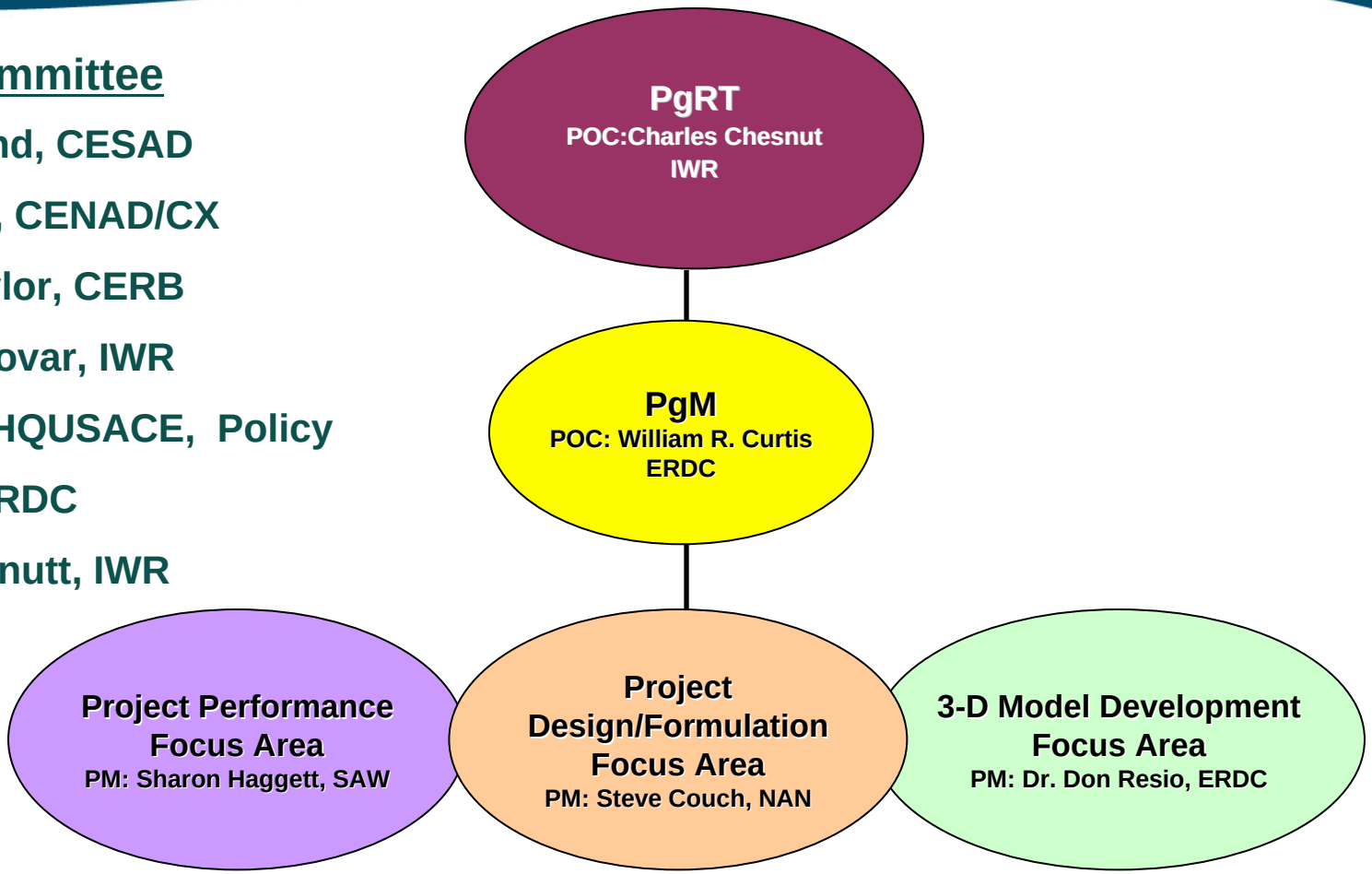
Dr. Bruce Taylor, CERB

Lillian Almodovar, IWR

Jan Rasgus, HQUSACE, Policy

Joan Pope, ERDC

Charles Chesnutt, IWR



Program Goals

Project Performance Assessment

- physical response
- economic –national and regional
- environmental
- social

Communicate outcome to coastal management stakeholders

Leverage opportunities to improve future project performance

Companion Initiatives/Opportunities

PL 108-324/84-99: Restore flood control and hurricane shore protection projects to their pre-storm condition (SAD)

USACE – District, MSC, NSMS, CFDCP, RSM Demo, Cx

Other Federal:

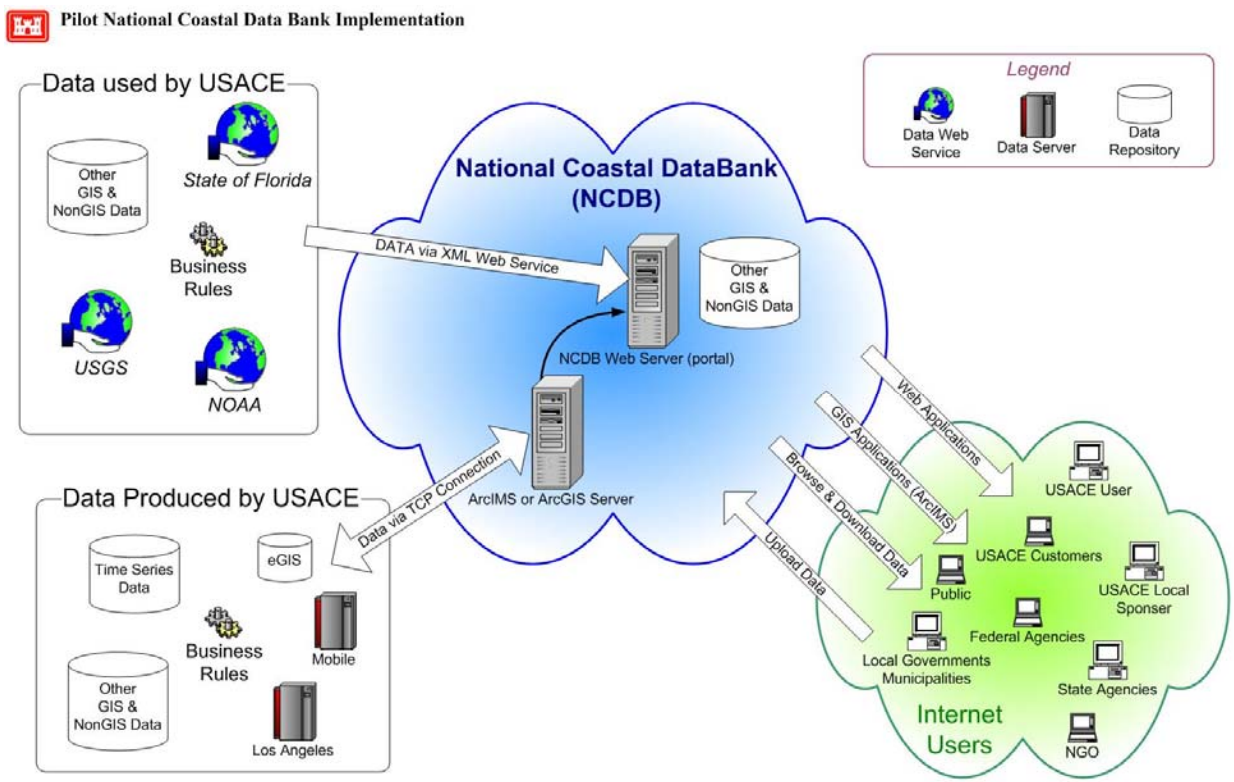
e.g., USGS, FEMA, NOAA, DOT, NHC, ONR, …

Non-Federal:

e.g., FL DEP, Local Partners, CSO, TNC…

Data Management

- Develop Pilot
- Web portal and search engine for coastal data and information
- Web application service for various coastal data manipulations, calculations, and analysis tools
- Common goal of data access thru distributed net work (IOOS, eGIS, SWWRP)



Outreach


SHORE PROTECTION ASSESSMENT

When a hurricane strikes, how do shore protection projects perform?

After an unusual hurricane season in 2004 – when four hurricanes made landfall in the southeastern United States in just six weeks – the U.S. Army Corps of Engineers was presented with a unique opportunity to assess shore protection project performance.

The Corps of Engineers and others will use these findings to improve future projects by better predicting how storms move sediment, change shores, and cause damage.

Shore Protection Assessment is an initiative to evaluate how federal shore protection projects performed in the wake of hurricanes Charley, Frances, Ivan, and Jeanne in 2004 and Hurricane Isabel in 2003.

Shore Protection Assessment will answer three questions:

1. How did existing projects perform?
2. How can future projects be improved?
3. Can we better predict how hurricanes change shores?

SIGNIFICANCE

There have been few opportunities to determine how shore protection projects respond to a series of hurricanes affecting the same geographic region within a short time. Shore Protection Assessment is a unique opportunity for a **comprehensive and coordinated technical evaluation.** Lessons learned will be applied in developing future projects. Shore Protection Assessment will ensure **stewardship** of **federal tax dollars** by improving the way shore protection projects are planned, designed, constructed, and maintained.

A **multidisciplinary team** of experts from the Corps and other federal agencies, state governments, local partners, and contractors are collaborating on this initiative. The Corps is working closely with representatives of the Coastal Engineering Research Board, National Shoreline Management Study, Planning Center of Expertise for Hurricane and Storm Damage Prevention, and other partners on this program.

2004.
Four hurricanes make landfall in the southeastern United States

Hurricane **Charley,** a Category 4 storm, struck the southwest Florida coast on Aug. 13, 2004.

Hurricane **Frances,** a Category 2 storm, hit the central east coast of Florida on Sept. 5, 2004.

On the heels of Frances came Hurricane **Ivan** on Sept. 16, 2004, a Category 3 storm near Gulf Shores, Alabama.

By the time Hurricane **Jeanne,** a Category 3 storm, made landfall on the central east coast of Florida on Sept. 25, 2004, it marked the first time since 1886 that a state had been affected by four hurricanes in one tropical storm season.

2003.
Hurricane Isabel strikes

After making landfall on Sept. 18, 2003, Hurricane **Isabel** left behind significant damage along her path in North Carolina and Virginia.

All five of these hurricanes caused wind, wave, flooding, and erosion damage, affecting 24 federal shore protection projects in the region. Shore Protection Assessment will evaluate data collected from the 2004 storms as well as from Hurricane Isabel, which provides another valuable point of reference.

continued on reverse ›››

Products

- Fact Sheet on Shore Protection Assessment
- 2004 Hurricane Overview sheet
- Individual 2004 Hurricane Primers
- Role of Corps and Shore Protection (in progress)
- Storm Ashore (in progress)

Outreach

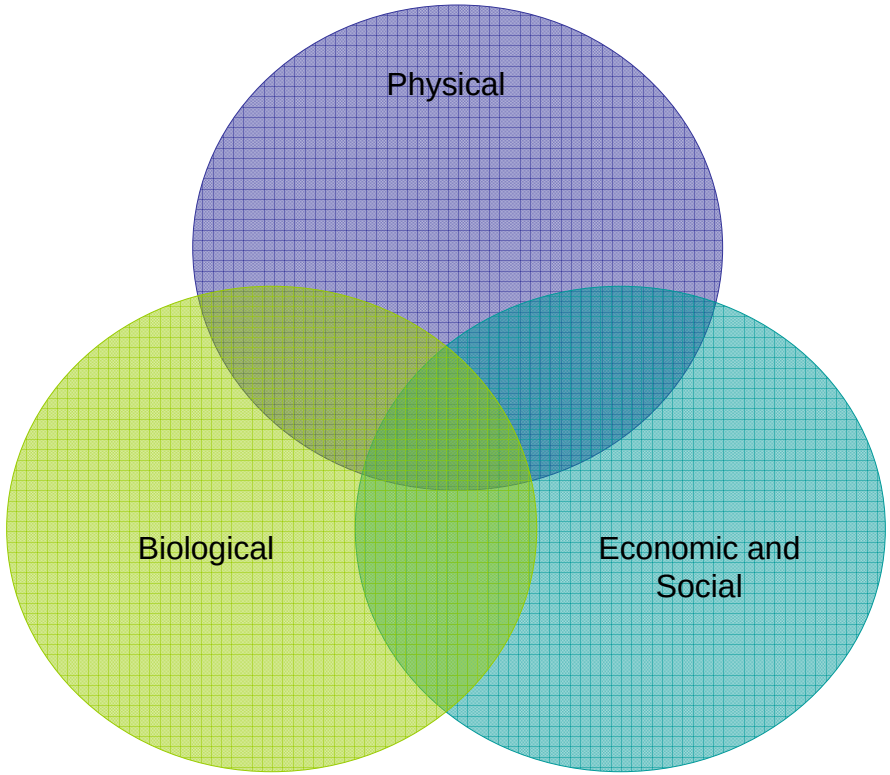
External

- Clean Beaches Summit - Nov. ’05
- CERB Presentation - Nov. ’05
- Coastal Voice Article - Feb. ’06
- Planning Ahead Article - Feb. ’06
- Florida Shore BPA - Feb. ’06
- ASBPA Presentation - March 3rd, ’06
- Congressional

Internal

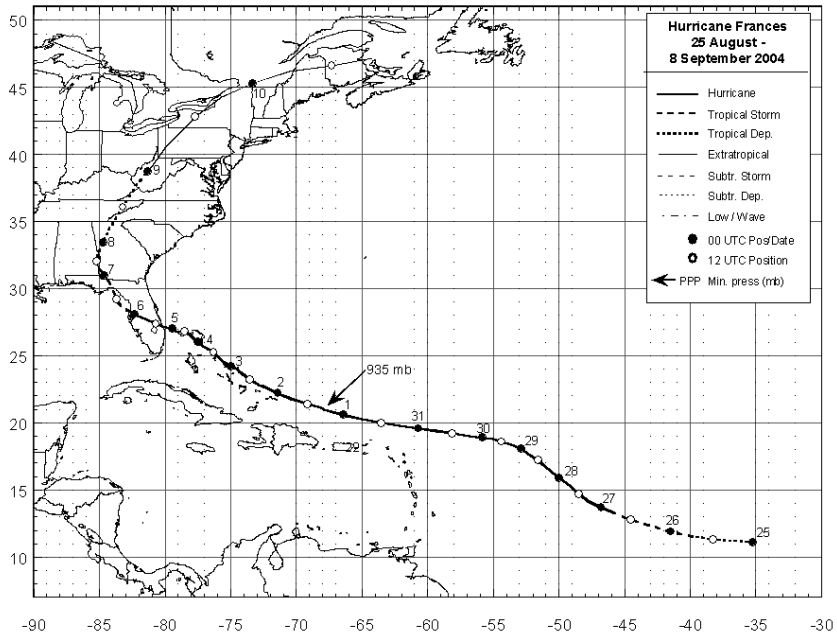
- Public Affairs Offices
- General Walsh - Feb. 24th, ‘06
- Planning CoP - Feb. & May ‘06
- Coastal CoP - May ‘06
- Technical Coordination - Ongoing
  - Intra S3P2I
  - Extra S3P2I

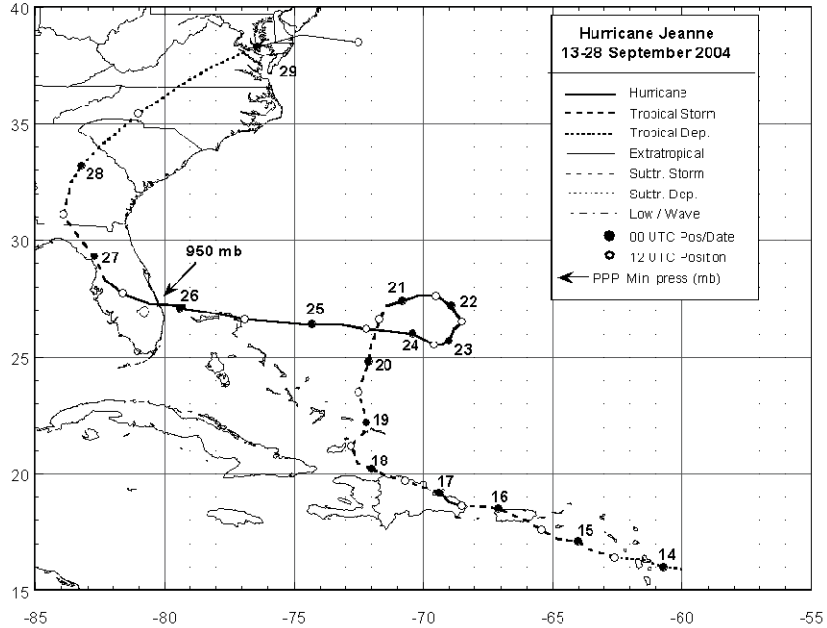
Performance Assessment



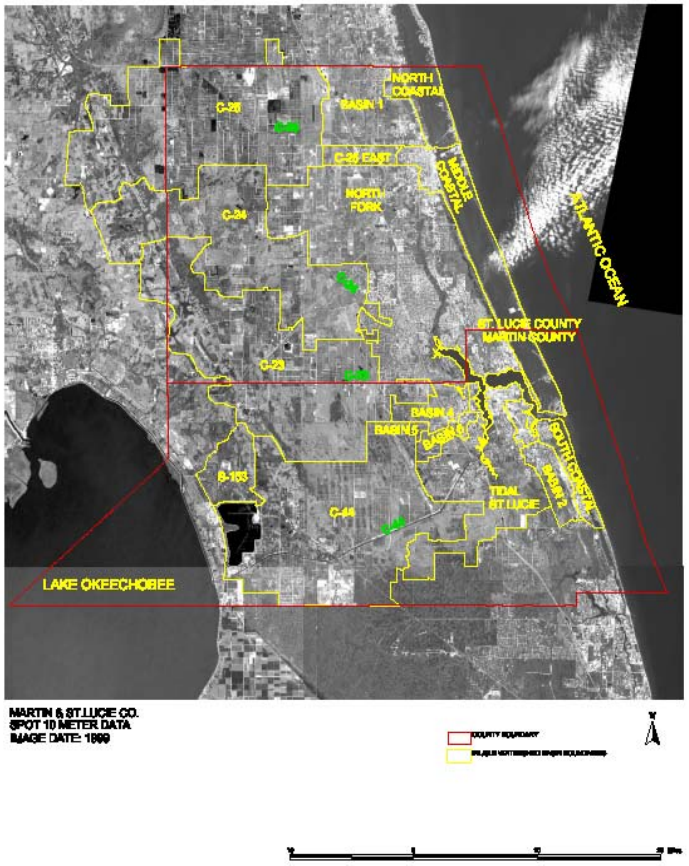
PM: Sharon Haggett, CESAW

Case Study: Martin County, FL





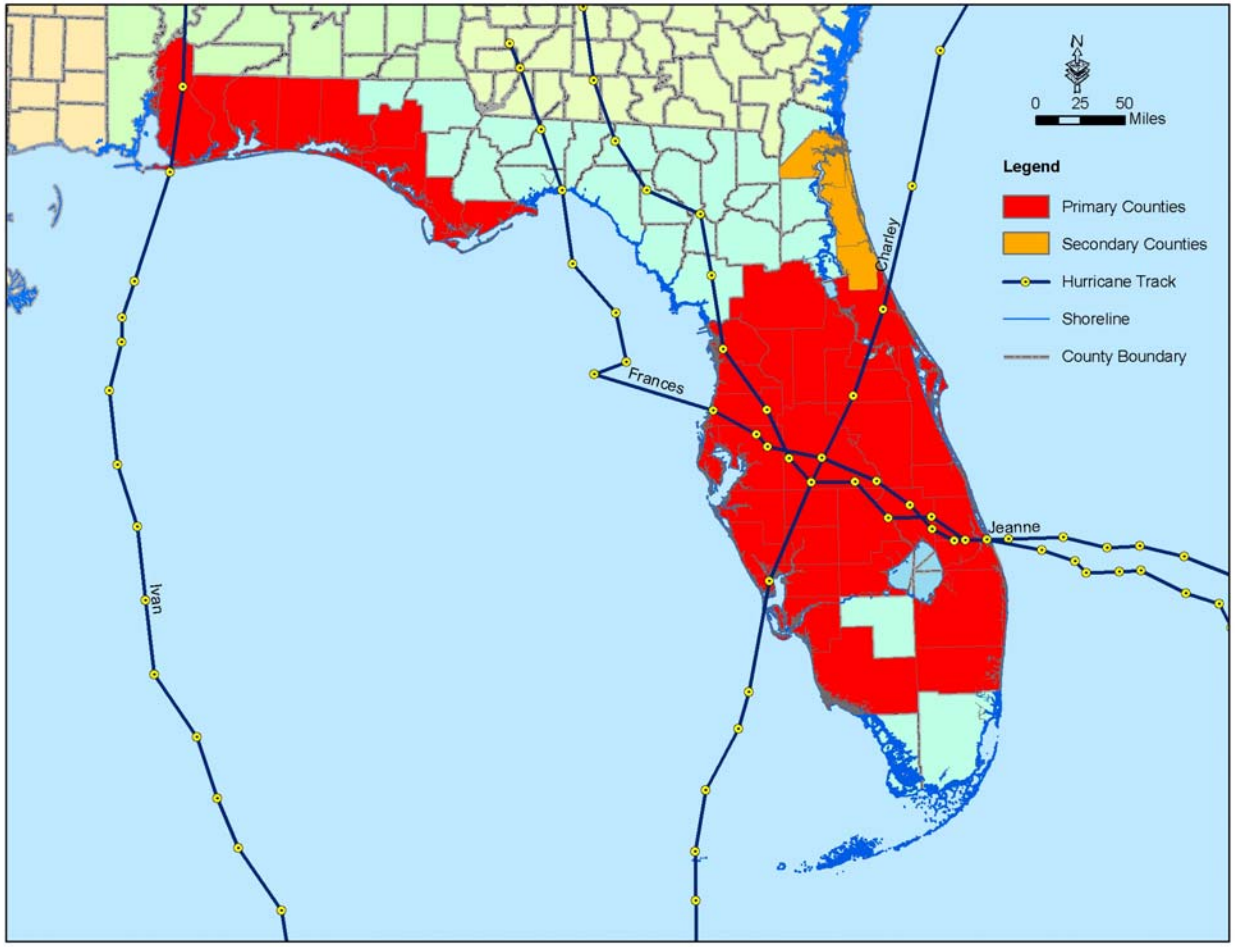
Watershed Assessment



Watershed Assessment

- Watershed Description
- Federal and non-Federal Projects
- Historical Information
- Water Management Strategies
- Historical Weather Events and Past Project Performance
- 2004 Storm Characteristics
- Hydrologic Information
- Water Quality Data
- Sediment Management Issues
- FIND Activities
- Bank Stability Issues
- Muck Removal
- Impacts to Navigation
- State of Florida Proposals
- Project-related Economic Considerations
- Watershed-wide Economic Considerations
- Hard bottom Impacts
- Breaches of Barrier Islands
- Habitat Impacts
- Fish Kills
- Aquatic Vegetation
- Best Management Practices
- Cultural Resources

2004 Florida Hurricane Season



Design and Formulation Improvement

Objective:

Review design and formulation procedures relative to projects affected by the tropical events of 2004 (and others) to identify and recommend beach nourishment formulation and design improvements that could be incorporated into the planning process

PM: Stephen Couch, CENAD/Cx

Design and Formulation Improvement

Products:

- Documentation of Current Formulation and Design Procedures, and proposed changes
- Risk-based Beach Fill Design Guidelines
- Risk-Based Evaluation Guidelines (Beach-Fx Lifecycle Model, Operational Guidelines)
- Project Implementation, Monitoring and Maintenance Guidelines
- Recommendations for Incorporation of Changes in Corps Guidance and Regulations

Capability Development

- Risk-based analysis procedures to quantify the role of dunes, berms, transitions, hard structures, and non-structural measures in storm damage reduction analyses
- Beach-*fx* operational guidelines for field application of the model
- Renourishment optimization procedures including borrow area characterization and erosional hot spot characterization
- Optimized emergency fill procedures

Capability Development

Beach-*fx* operational guidelines for field application of the model including

- **Estimation of out-of-placement area project benefits**
- **Quantification of the protective benefit of the advanced nourishment section**
- **Interaction between separate construction reaches and project design optimization**

Benefit

Consistent framework for design and formulation of shore protection projects

- Enhance effectiveness of Regional Business Centers & Planning Center of Expertise
- Efficient Technical and Policy reviews

MORPHOS-3D

Objective

Develop and verify a community 3D coastal simulation and prediction capability with emphasis on storm-driven events

Phase I: Prototype Demonstration

- **2-Year Development Effort**
- **1-Year Demonstration/Testing**
- **2004 FL Hurricane Season Demo**

MORPHOS-3D

Phase I Coastal Predictions


Hurricane Isabel Breach

- Storm Waves
- Storm Surge
- Coastal Currents
- Coastal Flooding
- Sediment Erosion / Deposition
- Coastal Morphology
- Barrier Island Breaching

Community System Focus Area

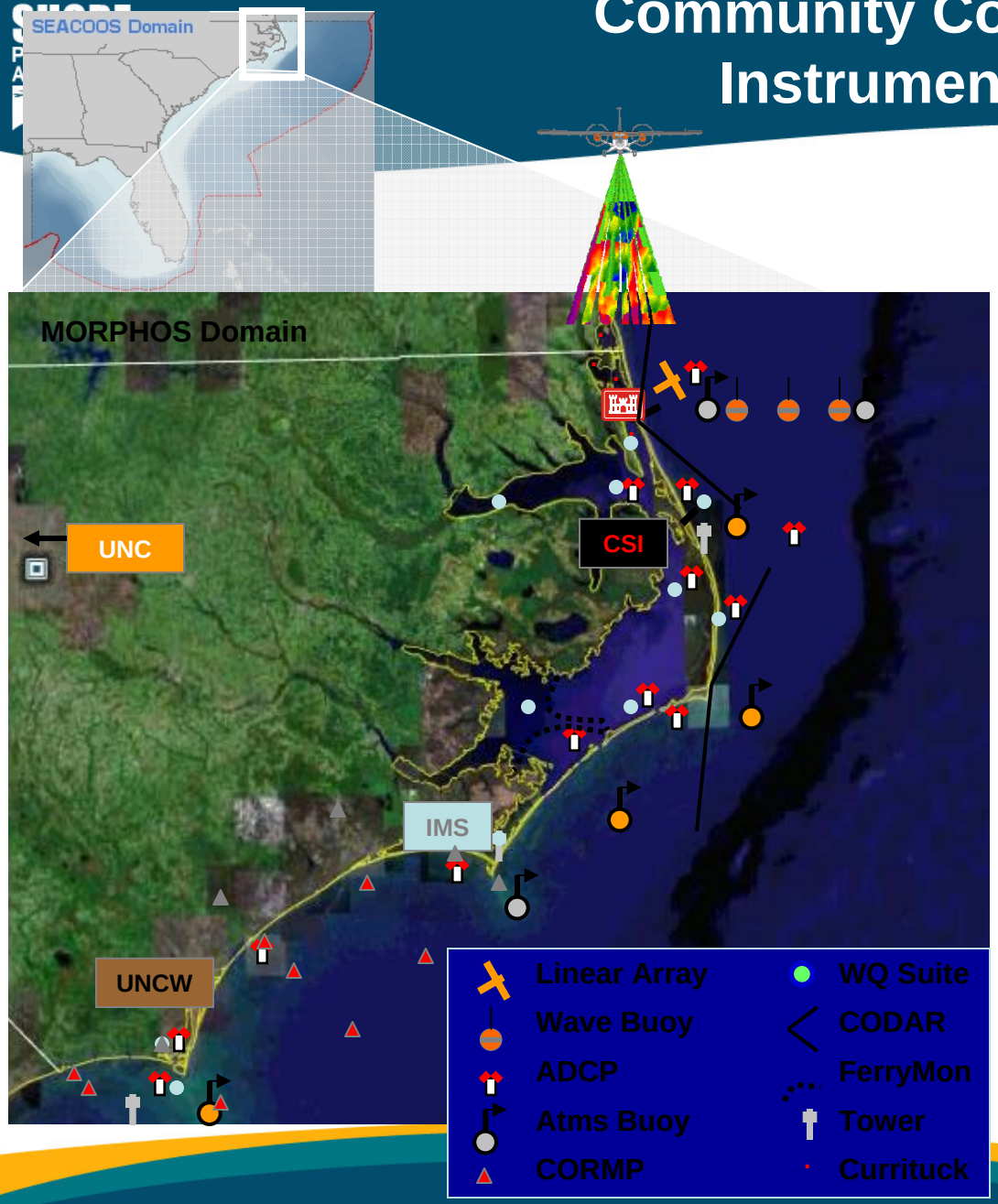
- Open-Source Community Model
- Certified Applications Upon Completion of VAA
- Convenient Module Selection
- Global GIS Capability
- Efficient Delivery Mechanism
- Community Outreach and Training

Earth System Modeling Framework

A Multi-Agency Partnership: NOAA, USGS, NASA, NAVY, and others…

Community Coastal and Estuarine Instrumented Test Range

US Army Corps of Engineers



Corps Benefits

- Natural Laboratory for Model Development and Benchmarking
- Focused Support of District Projects
- MORPHOS Test, Evaluation and Training

Community Benefits

- Operational Observations / Forecasts
- Impact/Response Modeling
- Pooling of Multi-agency Resources for a Common Regional Observing System

Potential Partners

- USACE Wilmington District
- Coastal Studies Institute
- UNC / Institute of Marine Science
- UNCW / CORMP
- ECU
- NOAA NWS
- SEACOOS
- State and Local Governments